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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/579,658

02/05/2007

Donald James Highgate

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EXAMINER

APICELLA, KARIE O

ART UNIT

PAPER NUMBER

1795

NOTIFICATION DATE

DELIVERY MODE

02/19/2010

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

euspto@slspatents.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/579,658	<b>Applicant(s)</b> HIGHGATE, DONALD JAMES	
	<b>Examiner</b> Karie O'Neill Apicella	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 05 February 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12-27-06</u>  | 6) <input type="checkbox"/> Other: _____                          |

**DETAILED ACTION**

1. Claims 1-14 are pending in this office action.

***Priority***

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d) or (f), which papers have been placed of record in the file.

***Information Disclosure Statement***

3. Information disclosure statement (IDS), submitted December 27, 2006, has been received and considered by the examiner.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear how the hydrophilic material can be “ionically inactive” when the “hydrophilic ion-exchange membrane” of Claim 1 is an “ion-exchange membrane”, which would render it ionically active.

***Claim Rejections - 35 USC § 102***

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6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-8 and 12-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Hilmer (US 3,492,163).

With regard to Claim 1, Hilmer discloses a method of performing an electrochemical reaction in an electrochemical cell comprising electrodes (11, 12) separated by a hydrophilic ion-exchange membrane (13) made up of a fibrous asbestos matrix suitably contained in a single or double walled ion-exchange membrane (column 4, lines 13-26), wherein the reaction is conducted in the presence of an aqueous solution of an electrolyte KOH of which the concentration and volume is controlled since it is self-adjusting during operation (column 4, lines 44-55 and column 5, lines 9-11).

With regard to Claims 2-4, Hilmer discloses wherein the degree of hydration of the membrane is controlled by removing water from the membrane through vaporization (column 5, lines 58-67).

With regard to Claim 5, Hilmer discloses wherein water is a reactant in the oxidant electrode reaction (column 5, lines 70-74), and the input of water into the cell is controlled by the formation of an equilibrium state in which the water vapor product continuously leaves the surface of the membrane and enters the transport liquid contained in the cavity (27) (column 6, lines 1-53).

With regard to Claim 6, Hilmer discloses wherein the electrolyte is potassium hydroxide (column 4, lines 44-48).

With regard to Claims 7 and 8, Hilmer discloses wherein the hydrophilic material is a fibrous asbestos matrix material that is contained in a single or double walled ion-exchange membrane, which is ionically active (column 4, lines 13-26).

With regard to Claims 12 and 13, Hilmer discloses wherein the cell is a fuel cell in the form of a membrane-electrode assembly (MEA), the MEA being made up of two electrode members (11, 12) in direct contact with opposite surfaces of the electrolyte matrix (13) saturated with an aqueous electrolyte and connected to an external load (column 3, lines 72-75).

With regard to Claim 14, Hilmer discloses that the original electrolyte concentration in the electrolyte matrix may be 34 percent KOH by weight. After some operation, the concentration on the oxidant electrode side is raised to 36 percent KOH by weight (column 6, lines 5-12). Hilmer also discloses that during cell operation, the capillary pores of the electrolyte matrix must be substantially filled with solution and if it is not so filled, the oxygen or hydrogen gas pressure in the respective gas cavities could exceed the capillary pressure thereby allowing oxygen or hydrogen to penetrate the electrolyte matrix, causing chemical short circuiting of the cell by overheating (column 5, lines 24-33).

***Claim Rejections - 35 USC § 103***

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8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hilmer (US 3,492,163), As applied to Claims 1-8 and 12-14 above, and in further view of Naito et al. (US 3,925,332).

Hilmer discloses the method of performing an electrochemical reaction in an electrochemical cell comprising electrodes separated by a hydrophilic ion-exchange membrane, made up of a fibrous asbestos matrix suitably contained in a single or double walled ion-exchange membrane, but does not specifically disclose wherein the hydrophilic material is a polymeric material, wherein the hydrophilic material is obtainable by the polymerization of monomers including methyl methacrylate, N-vinyl-2-pyrrolidone or acrylonitrile and wherein the hydrophilic material is cross-linked.

With regard to Claims 9, 10 and 11, Naito et al. discloses a hydrophilic membrane for use in a fuel cell of the hydrogen-oxygen type wherein an alkaline electrolyte and ion-exchange membrane are used (column 7, lines 33-46). Naito et al. discloses wherein the hydrophilic membrane is prepared by sulfonating a substrate of a polymeric composition comprising a copolymer of ethylene copolymerized with 3.0 to 18.0 mole % of a comonomer of the formula:

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wherein  $\text{R}_1$  is hydrogen or a methyl group,  $\text{R}_2$  is an alkyl group with 1 to 5 carbon atoms and  $\text{R}_3$  is hydrogen or an alkyl group with 1 to 6 carbon atoms, or an ionically crosslinked derivative thereof (only when  $\text{R}_3$  is hydrogen). Typical examples of the copolymer include ethylene-methyl methacrylate (column 2, lines 6-26). At the time of the invention it would have been obvious to one of ordinary skill in the art to use a polymeric material of a polymerized methyl methacrylate monomer and an ionically crosslinked derivative as the hydrophilic material of the membrane of Hilmer, because Naito et al. teaches that the hydrophilic membrane obtained is endowed with excellent hydrophilic properties, ion-exchange capacity and electrochemical properties which are permanent in nature, as well as, little degradation in other physical properties and resistance to acids and alkalis (column 4, lines 60-67).

### **Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karie O'Neill Apicella whose telephone number is (571)272-8614. The examiner can normally be reached on Monday through Friday from 8am to 5pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Karie O'Neill Apicella/  
Examiner  
Art Unit 1795

KOA